LETTERS TO THE EDITOR.

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Railways and Moving Platforms.

IN reference to Prof. John Perry's letter in NATURE of Aug. 30 on the subject of "Railways and Moving Platforms," will you kindly allow me to state that I worked out a scheme for moving platforms for railways in India in the year 1877, and that a paper of mine on the subject was published in the professional papers of the Thomason Civil Engineering College at Rurki in India in 1877 or 1878?

My plan was to have alongside of the main line a length of about a mile of level line, with a steep incline at either end, for the moving platform.

The moving platform would acquire sufficient speed on these inclines to run alongside of, and be made fast to, a train on the main line running in the same direction at reduced speed.

After the platform had been made fast, and passengers and crates of luggage transferred to a similar platform on the train, the train was to increase its speed, and finally release the platform with sufficient way on to carry it up the incline at the other end of its run, so as to be in readiness for the next train from the opposite direction.

This represented the case for moving platforms in its simplest form to suit Indian traffic. Details, of course, can readily be suppl.ed.

W. SEDGWICK
(Lt.-Col. late R.E.).

September 3.

The Migration of Swifts.

REFERRING to the letter of Mr. O H. Latter in NATURE of August 30, there are swifts' nests in the roof of my house, and the birds went to their nests as usual on the evening of August 11, but on the following evening, Sunday, August 12, they had gone. In other houses close at hand swifts remained on the 13th and 14th, but by the evening of the 15th all had disappeared. On one occasion some years ago a solitary swift remained after his companions had departed, and consorted with the neighbouring house martins until the last week in September.

A curious occurrence was observed by me on May 26 last, when the swifts had already been for some time with me But on the afternoon of that day I was on board the Transatlantique Company's steamer crossing the Mediterranean from Marseilles to Algiers in order to observe the total eclipse of the sun. The boat left Marseilles at one o'clock, and at 4h. 40m., by which time we were seventy miles from the land, a flock of birds was seen following the ship in the distance. In a few minutes they were flying round the ship, and turned out to be common swifts. They were estimated to be about 200 in number. They gradually forged ahead, leaving the ship behind, and in a few minutes were lost in the distance. Several of the passengers made a note of the occurrence. The course followed by the swifts was one or two points to the right of the ship's course, or about S.S.W., in the direction of the Balearic Islands.

WILLIAM ANDREWS.

Steeple Croft, Coventry, September 1.

The Reform of Mathematical Teaching.

THE deeply interesting letter of Mr. David Mair on the above subject in a recent number of NATURE will no doubt be attentively perused. Many, I imagine, could echo his experience when he says, speaking of 100 boys at a "well-taught school," "hardly one failed to write out the construction and proof, but only one of the hundred carried out the practical construction. Clearly our present Euclidian teaching has little to do with geometry."

Grave dissatisfaction in regard to the study of Euclidian geometry has long been voiced in Great Britain and in France, and the reason for the continued lamentable state of things in that special scientific direction is not, I think, far to seek. When Euclid, as a practical teacher, made use of his Propositions, theory and practice had doubtless that close association which Mr. Mair appears rightly to desire as a remedy for the present extraordinary condition of Euclidian study.

Now, if we assume that Euclid's own pupils were first of all drilled in a thorough knowledge of the sub-geometric properties of the cube, we are led largely to modify the supposed indictment against Euclid's method.

Again, Euclid seems to me to have used constructions, not only of a strict, but of a particular or edificial nature; so that, properly viewed, each succeeding proposition carried, not only its specific teaching or lesson, but beautiful groups also of surrounding truths of an implicit character.

If the foregoing remarks be valid, it is easy to see that only two serious faults can be charged against Euclid's method—namely, the use of false diagrams and indirect demonstrations. The former, of course, being misleading, are not in harmony with the modern Herbartian cumulative principles of "educative instruction."

As to the second fault, the splendid argumentation of the famous Simson in his "Notes" will not, I fear, greatly avail in Euclid's favour. Mr. Mair rightly vindicates for the pupil the power of "educational interest," another Herbartian doctrine, by the by; and I agree with him that "geometry is in worse case than algebra," because with the latter, I opine, the notion of "zero" inevitably leads the mind towards the necessary cubical standard.

No one could reasonably wish the true Euclidian or edificial geometry to be suppressed, but might without presumption press for a reform in the way of presenting all geometrical truths by a direct reference to those sub-geometric conditions which have equal rank with the oldest of nature's immutable laws.

If for any school or pupil, instead of enlarging the mental vision, and creating intellectual joys, the Euclidian tasks savour of prolonged drudgery, mystery and confusion, as they assuredly often do, such toil should perforce be abandoned to prevent, at least, waste of time and energy, not to speak of the gain to human happiness.

Possibly in the broad expanse of the educational economy the universities of the world may eventually suggest practical reforms of a vital kind in the teaching methods that affect mathematical science.

I am not competent to pursue the subject to any length, but I might remind students that, although by a sort of repartee to a kingly personage Euclid said there was "no royal road to geometry," he did not say there was no royal gate to it, and that I trust I have, however faintly, herein indicated.

HENRY WOOLLEN.

August 25.

The Trembling of the Aspen Leaf.

IT is well known that the vibratory motion of the leaf of the aspen and other poplar trees is caused by a flattening of the petiole at its junction with the lamina. The lower part of the leaf-stalk is elongated and rigid, thus forming a basis upon which the flattened portion of the stalk can, in virtue of its elasticity, move to and fro as the wind acts upon the leaves of the tree. It is stated by Kerner that this adaptation prevents the leaves striking against each other and the branches of the tree, whereby they might get bruised. In this connection it is a noticeable fact that the poplars which exhibit this property of leaf-vibration most strongly have sparsely distributed leaves, and the foliage is scanty in comparison with other trees of the genus, especially the abele, or white poplar.

With reference to the abele, it may be noticed that the leaves which possess the trembling motion in a slight degree are covered with a white felting, which Kerner asserts is an adaptation to protect the stomata from the excess of atmospheric moisture which prevails in the damp situations and river-sides where this tree commonly grows. Yet, it may he noted, the aspen is found in precisely similar conditions, and must be affected injuriously by any influence that would act unfavourably upon the abele. Now, it has occurred to me that the real use of the vibratory motion of the aspen leaf may be an adaptation to throw off rapidly the excess of aqueous condensation liable to take place upon the foliage of trees growing in marshy situations. I should very much like to hear the opinions of some of your readers on this point, which, if a true solution of the matter, is interesting from the fact that the same end is

secured by very different means in two plants of the same genus, and so very much alike in all other particulars.

Hobart, July 25. HENRY J. COLBOURN.

Electricity direct from Coal.

WITH reference to the announcement made in the *Daily Mail* of September 1, that Thomas A. Edison had completed a machine for the generation of electric power direct from coal without the use of engines or dynamos, may I ask you to reprint a few lines from an article on electric traction I wrote for you, and which you published on April 12, 1894?

"Before electric traction can be employed on a very large scale, we must possess a means of producing the electricity on the spot and at the time it has to be used, or, in other words, we must possess a battery in which the energy of coal can be transformed directly into electric current, so that we may do without storage batteries in which to carry electric energy about, or heavy copper conductors through which to convey it at moderately low tension from the spot where it is produced to where it is used, or light aërial conductors through which to convey it at high tension.

"How long we shall be without this, or how many minds are engaged in the solution of this or some such problem, we know not, but the moment it is solved, and solved doubtless it will be, there will be such a transformation scene in the industrial applications of electricity as one can hardly conceive. It would mean that for almost all purposes except those in which heating is required electricity would or could be used. An electric light-producing battery in every house, quite independently of any mains in the streets; an electric power-producing battery to carry us whither we would on rails or on the streets; and in every house to put an end to all the evils attendant on crowded factories and workshops, in crowded streets and towns; such and other advantages would result from turning electricity from a servant into a master, from a mere transformer of energy into a source of energy."

E. F. BAMBER.

48 St. James's Square, W., September 3.

Artificial Deformations of Heads, and some Customs connected with Polyandry.

WITH reference to your note on M. Charles de Ujfalvy's recent article in *l'Anthropologie* (p. 323, *ante*), I may be allowed to call your attention to the ancient Korean practice of artificially deforming their heads, which was apparently similar to the method adopted by the Huns as well as the Hûna kings of India. Thus, the Chinese "History of the Later Han Dynasty," written in the fifth century, *sub.* "Eastern Barbarians," says: "The people of Ma-Kan (in the south-western part of the Korean peninsula) wish their heads flat; so the head of every child just born they compress with stone to deform it."

The special horned head-dresses worn by the polyandric women of the White Huns put in mind the old Japanese usages, described by Fujioka and Hirade in their "History of the Japanese Customs and Manners," Tokio, 1897, vol. i. p. 169: "In the festival of the god of Tsukuma, every woman had to go in procession after the holy sedan-chair, with a number of pans on her head proportionate to her immoralities. In the temple of Usaka, while the priest was praying in a feast-day, every woman was scourged on similar principles."

KUMAGUSU MINAKATA.

1 Crescent Place, South Kensington, August 11.

Huxley and his Work.

ON p. 13 of "One Hundred and One Great Writers," issued by the *Standard*, and presumably edited by Dr. Garnett, occurs the following remarkable account of Huxley and his work. "Huxley's work is that of the populariser, *the man who makes few original contributions to science or thought*, but states the discoveries of others better than they could have stated them themselves." Comment is needless. F. W. HENKEL.

Markree Observatory, Collooney, Ireland, August 23.

THE CAUSES OF FRACTURE OF STEEL RAILS.

WHEN the down Scotch express was running through St. Neots station, on the Great Northern Railway, on December 10, 1895, a rail broke into seventeen pieces, part of the train left the metals, and a serious accident resulted. Several features of the report on the mishap, drawn up in the ordinary course by the late Sir Francis Marindin, might well have occasioned deep thought, notably the conclusion that the first fracture of the rail took place over a chair at a minute induced flaw, which did not exist when the rail was manufactured.

The whole report, however, is suggestive rather than explanatory, and the result was the appointment by the Board of Trade of a committee to investigate the question of the loss of strength of steel rails caused by prolonged use. The committee was a very strong one, and contained some distinguished steel manufacturers, engineers, metallurgists and chemists. They collected a vast amount of information, much of it apparently considered unsuitable for publication, and made long series of experiments, many of them, judging from the report, more easily made than their results explained.

Finally, after four years' work, they have issued a report with the satisfactory feature that practically no change is recommended to be made in the mode of management of the permanent way by the railway companies.

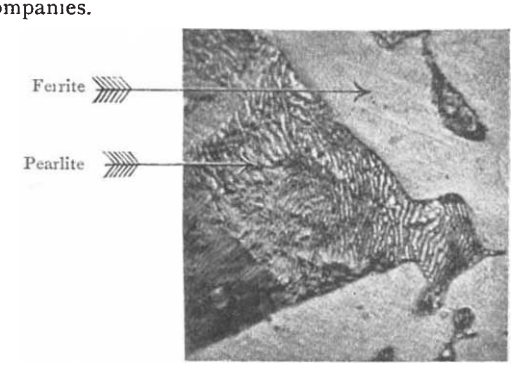

FIG. 1.—Steel rail. × 850 D. Showing pearlite and ferrite.

Nevertheless, although no legislation seems likely to result from the labours of the committee, the evidence that has been collected and published in the appendices to the report is of great scientific interest. The experimental work that was undertaken was divided among the members of the committee. A number of rails found broken on the road, or discarded as worn out, were selected for examination. Prof. Unwin took charge of the tests on their hardness, tensile strength and bending strain, and Mr. Windsor Richards of those on their resistance to the shock of falling weights; Sir William Roberts-Austen made micrographical examination of the rails, and Dr. Thorpe analysed them. Sir Lothian Bell includes in his comprehensive memorandum details of a number of mechanical tests on rails, and Prof. Dunstan gives an interesting account of the effects of atmospheric corrosion.

Interest naturally centred around the St. Neots rail. It was found to be of ordinary composition, and the mechanical tests applied to it showed that the steel was of variable, but, on the whole, of good quality. It was only on microscopic examination that the extraordinary character of the rail became evident. Good rail steel, according to Sir W. Roberts-Austen, consists of "ferrite," or iron free from carbon, and "pearlite," which is a mixture of alternate bands of ferrite and "cementite" (the carbide corresponding to the formula Fe_3C). The structure is shown in Fig. 1, a reproduction of a micro-